

REMARKS

The Examiner's continued attention to the application is noted with appreciation.

Claim Objections

In the Advisory Action dated January 22, 2008, the Examiner noted that the prior amendment to claim 1 would overcome the objection to claims 1, 3-8, and 10-17 but would not overcome any of the claim rejections. The Examining Attorney also noted that claim 21 also includes the same language that was changed in claim 1. Claim 21 has been amended replacing "namely" with "wherein."

Claim Rejections Under 35 USC § 112

The Examiner rejected claims 1-8 and 10-21 under 35 USC § 112 ¶ 1, as failing to comply with the written description requirement, and stated that the claims contain subject matter which was not described in the specification to show possession of the claimed invention. The Examiner further stated that "the mere absence of a positive recitation is not basis for an exclusion," citing *Ex parte Graselli*, 231 USPQ 3693, F.2d 453 (Fed. Cir. 1984).

Applicant has amended independent claim 1 to recite: "An energy dense energetic material comprising: a layer of material comprising one or more metals substantially not in oxide form, comprising one or more compositions selected from the group consisting of metal hydrides and metals with interstitial hydrogen; and a layer of material comprising one or more metals substantially in oxide form; and wherein said layers in combination are energetic, reduce diffusion flux, maximize the liberation of a gaseous reaction product, and have a thickness of less than or equal to approximately 10 nm."

Applicant has amended independent claim 18 to recite: "An energy dense energetic material comprising: a first layer of material, comprising one or more compositions selected from

the group consisting of metal hydrides and metals with interstitial hydrogen; and a second layer of material, comprising one or more metals substantially in oxide form; and wherein said first layer is disposed next to at least one said second layer, and said first and second layers in combination are energetic and have a thickness of less than or equal to approximately 10 nm."

Therefore, independent claims 1 and 18 as amended are definite and do not claim new matter. Claims 3 through 8 and claims 10 through 17 depend on claim 1, and claims 19 and 20 depend on claim 18 respectively. Accordingly, claims 1, 3-8 and 10-21 are now in condition for allowance.

Claim Rejections Under 35 USC § 103(a)

The Examiner rejected claims 1, 3-8 and 10-21 under 35 USC § 103(a) as being unpatentable over Danen et al. (U.S. Patent No. 5,266,132). The Examiner stated that regarding the limitation that the layer in non-oxide form be selected from non-adducted metal hydrides and metals with interstitial hydrogen, Danen et al. teach that the reacting materials may include aluminum, titanium, magnesium, lithium and hydrides thereof (col. 5, ln. 9-44). Danen et al. teach, in col. 5, lines 9-44, materials useful as reactive substances for metastable interstitial composites (MICs) and the products of the reactions. Danen et al. do not teach metals substantially not in oxide form, comprising one or more compositions selected from the group consisting of one or more metal hydrides and metals with interstitial hydrogen. Danen et al. teaches three reactant layers, consisting of a metal such as Al, an oxide such as CuO, and a third layer consisting of an aluminum hydride trimethylamine adduct having the formula of $\text{AlH}_3\text{N}(\text{CH}_3)_3$, an organic aluminum compound which is not a metal comprising a metal hydride. Here, the metal and the oxide will react, and the oxide will also react with the organic aluminum compound (aluminum hydride trimethylamine).

Danen et al. do not teach, anticipate or infer the optimization of hydrogen or any other

part of Applicant's invention. Danen et al. teach the use of an adducted form of a specific hydride (an organic aluminum compound) as a third layer, to create a high temperature gas. One skilled in the art would recognize that the use of the (first) Al and (second) CuO layers in Danen et al. are intended to provide the thermal energy necessary to drive the decomposition and subsequent oxidation of the third adduct containing layer, or, as Danen et al. recite: "the CuO to also react with the third component" (col. 5, line 44). Applicant's disclosure is fundamentally a different form of matter in that it teaches that only two layer systems (a metal comprising a metal hydride and a metal oxide) are necessary to be a gas former. The adducted metal hydride described by Danen et al. does not result in a self-propagating reaction when used only with the CuO; in fact, Danen et al. teach reactions must be triggered by an external agent (col. 1, lines 58-59 and col. 4, lines 31-34).

The Examiner stated that absent a teaching or showing the criticality of the metal hydrides being non-adducted the patent is not distinguishable from Danen et al. However, as stated above, Danen et al. teaches the oxidation-reduction pair would not self-propagate, but must be triggered by an external agent. This is a distinguishable and critical difference between Applicant's invention and Danen et al.

The Examiner states that claims 7-8, 10-11 and 18 – 20 are anticipated by Danen et al. and references col. 5 ln. 9-44. The Examiner states that Danen et al. teach that the reacting materials may include aluminum, titanium, magnesium, lithium and hydrides thereof and that the oxide materials may include Fe. The language "... and hydrides thereof" does not appear in the referenced patent in col. 5 ln. 9-44 and is not taught, anticipated or inferred. Therefore, Applicant has traversed any rejections based on obviousness in regard to amended independent claim 1 and amended independent claim 18.

Because claims 3-8 and 10-17 are dependent on patentable independent claim 1, and claims 19-20 are dependent on patentable independent claim 18, all the claims are now in condition for allowance.

Authorization is given to charge payment of any additional fees required, or credit any overpayment, to Deposit Acct. 13-4213. Also being filed herewith is a Request for Continued Examination with the appropriate fee.

An earnest attempt has been made to respond to each and every ground of rejection advanced by the Examiner. However, should the Examiner have any queries, suggestions or comments relating to a speedy disposition of the application, the Examiner is invited to call the undersigned.

Reconsideration and allowance are respectfully requested.

Respectfully submitted,

By: _____

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